REMARKS

Claims 1 and 34 have been amended to recite that the sensor senses the three-dimensional rotational orientation of the magnet and the two-dimensional translational position of the magnet. Support for the amendment is found on page 20, lines 9-17 of the specification as filed.

For consistency with the above amendment, Claims 1 and 34 have been further amended to recite that the display displays alignment of the sensor with the magnet. Support for the amendment is found on page 19, lines 5-13 of the specification as filed.

Claim 37 has been amended to correct a typographical error.

Claims 71-91 have been added.

Claims 71-91 correspond with withdrawn and canceled method Claims 19-22, 28, 30-33, 56-66, and 68 except that the independent method claims, Claims 71 and 81, further contain the limitations introduced to Claims 1 and 34, respectively. Accordingly, Claims 71-80 fall into Group II, and Claims 81-91 fall into Group IV according to the restriction requirement dated April 4, 2007.

Claims 8, 9, 13, 15-17, 19-33, 35-36, 38, 48, 52-53, 56-66, and 68-70 have been canceled without prejudice to their merit.

Claims 1-7, 10-12, 14, 18, 34, 37, 39-47, 49-51, 54, 55, 67, and 71-91 are pending, with Claims 1-7, 10-12, 14, 18, 34, 37, 39-47, 49-51, 54, 55, and 67 currently under consideration.

Statement of Substance of Interview as Per MPEP §713.04

Applicants thank the Examiner for the helpful interview held on April 8, 2010.

In the interview, it was discussed that a teaching of sensing the rotational orientation of an object in three dimensions is not taught in the prior art. The Examiner recommended including such a recitation in the independent claims.

In addition, it was also discussed whether Gilbert's general statement that the device taught therein "places no such restrictions on geometrical arrangement and tolerates the placement of sensors anywhere in three-dimensional space" constitutes the specific recitation in Claim 34 of an array of sensors comprising aligned, opposing pair members, wherein a first distance between members of a first pair of opposing pair members differs from a second distance between members of a second pair of opposing pair members.

Rejection of Claims 1-7, 10, 18, and 67 under 35 U.S.C. 103(a) over Durham (U.S. Patent 6,162,228), Catamo (WO 97/13467), Haynor (U.S. Patent 6,216,028), and Gilbert (U.S. Patent 5,731,996)

This rejection has been overcome by amendment of the claims.

Claim 1 has been amended to recite a sensor for sensing both the three-dimensional rotational orientation of the magnet and the two-dimensional translational position of the magnet. Claims 2-7, 10, 18, and 67 depend from Claim 1 and require the same recitation. This recitation is supported in the specification as filed at least by the following passage:

> Because the sensors 44 are aligned in opposing pair members, centering each pair over the target magnet 30 elicits the same magnitude output from each member of the pair. Upon exact centering, one member will "cancel out" the other member. Any deviation from exact center**, in either rotation or translation**, will cause an offset in opposing members of the sensor pair.
>
> By comparing voltage offset between opposing sensors in the array 42, the direction in the field can be determined… [T]he targeting device 40 allows centering with feedback of **offset in the x-y plane**, while providing feedback of **rotation about x, y, and z axes** 41, 43 and 36. (page 20, lines 5-17 of specification, in relevant part; emphasis added)

Accordingly, the recitation that the sensor senses the two-dimensional translational position of the magnet requires at least that the sensor senses whether or not the magnet is translationally positioned underneath the targeting device with respect to a plane, such as an x-y plane.

The recitation that the sensor senses the three-dimensional rotational orientation of the magnet can be illustrated by the terms "yaw," "pitch," and "roll" as used in aviation. These concepts are explained in Exhibit A, submitted in Applicants' Response dated March 22, 2010. "Yaw" is defined relative to a vertical axis (*e.g.*, a z-axis) and is used to describe whether an aircraft's nose is pointed to the left or the right. "Roll" is defined relative to a second horizontal axis (*e.g.*, an x-axis) passing through a plane from nose to tail and is used to describe whether an aircraft's wings are tilted from a horizontal position. "Pitch" is defined relative to a first horizontal axis (*e.g.*, a y-axis) passing through a plane from wingtip to wingtip and is used to describe whether an aircraft's nose is pointing down or up. In the present case, three-dimensional rotational orientation of the magnet refers to the yaw, roll, or pitch of the magnet relative to the targeting device.

In sum, the recitation that the sensor senses "the three-dimensional rotational orientation of the magnet and the two-dimensional translational position of the magnet" requires that the sensor be capable of providing both rotational and translational information.

The Office has cited Gilbert for teaching a device comprising a sensor array and employing a processor capable of determining the three-dimensional orientation of a magnet. See page 4, lines 7-11 of second full paragraph of Office Action dated January 22, 2010. Gilbert, however, does not teach a device capable of determining the three-dimensional rotational orientation of the magnet as recited in Claim 1. Gilbert teaches a device capable of providing only information regarding the translational position of an object.

That Gilbert teaches a device capable of providing only information regarding the translational position of an object is evident from Gilbert's emphasis in determining the **location** of an object. For example, Gilbert states:

> The present invention implements a method that simultaneously processes magnetic field measurements taken from an array of sensors to estimate the likelihood of one or more magnetic dipole sources at particular **locations in three-dimensional space**. (column 1, lines 53-57 of Gilbert; emphasis added)

In more specifically describing the method, Gilbert states:

> In the present invention, (a) a set of actual magnetic field measurements of a magnetic dipole is collected using a plurality of magnetic sensors. Then (b), a **location** for the magnetic dipole is hypothesized. Then (c), a set of estimated magnetic field measurements is determined that would be formed by a magnetic dipole at the hypothesized **location**. Then (d), the actual magnetic field measurements are compared with the estimated magnetic field measurements. Steps (b) through (d) are repeated for all hypothesized **locations** within the detection range of the array of magnetic sensors. (column 2, lines 55-58 of Gilbert; emphasis added)

Also see throughout the Detailed Description for other teachings directed specifically to determining the **location** of an object: column 3, lines 45-66 and especially lines 60-63 of Gilbert; column 4, lines 1-24, especially lines 10-23; column 4, lines 25-28, wherein Gilbert describes an equation for determining the magnetic field of an object "at a point in space";

column 7, lines 6-8; column 7, lines 23-24; column 7, lines 63-65; and column 7, lines 66-67, regarding the "spatial processing" of magnetometer data.

In contrast to the focus on determining the location of an object in space, Gilbert is completely silent regarding detecting the rotational orientation of an object.

In view of the foregoing, Gilbert does not teach a system capable of determining the three-dimensional rotational orientation of a magnet, as recited in Claim 1.

Durham also does not teach a sensor capable of sensing the three-dimensional orientation of a magnet.

The Office has alleged that Durham in FIG. 6 shows a "magnet having a non-uniform magnetic field, *i.e.*, not the same in all directions" that can provide information regarding rotational displacement (page 3, lines 5-8 of Office Action dated January 22, 2010). This allegation is traversed.

The text of Durham describes FIG. 6 as depicting a "high schematic perspective view" (column 6, lines 8-9 of Durham). A "schematic" illustration represents elements of a system using abstract graphic symbols rather than realistic pictures (see Exhibit B). A schematic illustration typically omits all details that are not relevant to the information that the schematic illustration is intended to convey and may further add unrealistic elements that aid comprehension (see Exhibit B). Thus, the magnetic field as depicted by FIG. 6 of Durham cannot be used alone to illustrate a teaching of a non-uniform magnetic field that can sense rotational displacement.

Turning to the text of Durham, there is no teaching anywhere in Durham indicating either that the magnetic field depicted in FIG. 6 is non-uniform or that the device disclosed therein is capable of sensing the rotational orientation of the field in three dimensions. Specifically referring to FIG. 6, Durham describes only determining the "**location** of a single magnet or magnet device 52" (column 6, lines 8-27 of Durham). See also the abstract of Durham. Durham is completely silent regarding detecting rotational orientation.

Furthermore, the present application, which is by the same inventor as the Durham reference, explicitly states that the Durham reference does not have the "ability to discriminate the orientation of the screw opening in three-dimensional space" (see paragraph spanning pages 6 and 7 of specification as filed).

Finally, the Office has stated that the magnetic field depicted in FIG. 6 is "symmetrical about the longitudinal axis of the magnet" (see page 3, lines 5-8 of Office Action dated January 22, 2010). Assuming for the sake of argument that this statement is true, such a magnetic field would not enable discrimination of the rotational orientation of the magnet about its longitudinal axis. This would thereby provide at least one axis about which the rotational orientation cannot be sensed.

In view of the foregoing, Durham does not teach a system capable of determining the three-dimensional rotational orientation of a magnet, as recited in Claim 1.

Catamo also does not teach a system capable of determining the three-dimensional rotational orientation of a magnet. Catamo is completely silent regarding sensing the three-dimensional rotational orientation of a magnet and provides teachings relevant only to sensing the location of an object. See, for example, the abstract of Catamo.

Finally, Haynor is cited by the Office only as teaching a magnet made from Neodymium Iron Boron (see paragraph spanning pages 3 and 4 of Office Action dated January 22, 2010). Haynor is completely silent regarding determining the three-dimensional rotational orientation of a magnet. Furthermore, as thoroughly documented on record, Haynor does not teach a system consistent with the recitation of the independent claims. See page 11 of Applicants' Response dated November 23, 2009; the Office's Interview Summary dated November 4, 2009; and pages 13-16 of Applicants' Response dated October 19, 2009.

In view of the foregoing, the combination of Durham, Catamo, Haynor, and Gilbert fails to teach the limitations recited in Claim 1. Therefore, Claims 1-7, 10, 18, and 67 are not obvious over the combination of Durham, Catamo, Haynor, and Gilbert.

Rejection of Claims 11 and 12 under 35 U.S.C. §103(a) over Durham, Catamo, Haynor, Gilbert, and Putative Admission

This rejection has been overcome by amendment of claims.

Claims 11 and 12 depend from Claim 1, the latter of which has been amended as described above. Claim 1 is not obvious over the combination of Durham, Catamo, Haynor, and Gilbert because the combination does not teach a sensor for sensing both the three-dimensional rotational orientation of a magnet and the two-dimensional translational position of the magnet.

The remarks expressed above relating to this point are incorporated in the present remarks by reference. The putative admission does not correct the deficiencies of the combination of Durham, Catamo, Haynor, and Gilbert with respect to Claim 1. Therefore, Claims 11 and 12 are not obvious over the combination of Durham, Catamo, Haynor, Gilbert, and putative admission.

Withdrawal of this rejection is requested.

Rejection of Claim 14 under 35 U.S.C. §103(a) over Durham, Catamo, Haynor, Gilbert, and Hollis

This rejection has been overcome by amendment of the claims.

Claim 14 depends indirectly from Claim 1, the latter of which has been amended as described above. Claim 1 is not obvious over the combination of Durham, Catamo, Haynor, and Gilbert because the combination does not teach a sensor for sensing both the three-dimensional rotational orientation of a magnet and the two-dimensional translational position of the magnet. The remarks expressed above relating to this point are incorporated in the present remarks by reference. Hollis does not correct the deficiencies of the combination of Durham, Catamo, Haynor, and Gilbert with respect to Claim 1. Specifically, Hollis is completely silent regarding sensing the three-dimensional rotational orientation of a magnet. Therefore, Claim 14 is not obvious over the combination of Durham, Catamo, Haynor, Gilbert, and Hollis.

Withdrawal of this rejection is requested.

Rejection of Claims 34, 37, 39, 40-47, and 49-51 under 35 U.S.C. §103(a) over Durham, Catamo, Haynor, Gilbert, and Putative Admission

This rejection has been overcome by amendment of the claims.

Claim 34 has been amended to be identical to Claim 1, except that Claim 34 is directed to detecting screw openings within an intramedullary nail and further recites that the array of sensors comprises aligned, opposing pair members wherein a first distance between members of a first pair of opposing pair members differs from a second distance between members of a second pair of opposing pair members. The device recited in Claim 1 is not obvious over the combination of Durham, Catamo, Haynor, and Gilbert because the combination does not teach a sensor for sensing both the three-dimensional rotational orientation of a magnet and the two-dimensional translational position of the magnet. The remarks expressed above relating to this point are incorporated in the present remarks by reference. The putative admission does not make up for the deficiencies of the combination of Durham, Catamo, Haynor, and Gilbert with respect to Claim 1. Because Claim 34 recites at least the limitations recited in Claim 1, Claim 34 and dependent Claims 37, 39, 40-47, and 49-51 are also not obvious over the combination of Durham, Catamo, Haynor, Gilbert, and putative admission.

With regard specifically to the limitations further recited in Claim 34 compared to Claim 1, Durham, Catamo, Haynor, Gilbert, or putative admission do not teach an array of sensors comprising aligned, opposing pair members wherein a first distance between members of a first pair of opposing pair members differs from a second distance between members of a second pair of opposing pair members.

The Office has cited Gilbert's teaching of a system that "places no such restrictions on geometrical arrangement and tolerates the placement of sensors anywhere in three-dimensional space" (column 2, lines 42-45 of Gilbert) as teaching this limitation. Specifically, the Office has stated that the sensor array of Gilbert "can comprise any number of sensors arranged in any desired pattern" (see Advisory Action dated April 6, 2010). However, "any desired pattern" is not a specific teaching of a first pair of sensors being a first distance apart and a second pair of sensors being a second distance apart. Rather, "any desired pattern" is an incredibly broad genus comprising an infinite number of possibilities.

MPEP §2144.08 speaks to the obviousness or non-obviousness of a species when the prior art teaches a genus. MPEP §2144.08(II) explicitly states (in relevant part):

> **The fact that a claimed species or subgenus is encompassed by a prior art genus is not sufficient by itself to establish a *prima facie* case of obviousness.** *In re Baird*, 16 F.3d 380, 382, 29 USPQ2d 1550, 1552 (Fed. Cir. 1994) ("The fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious."); *In re Jones*, 958 F.2d 347, 350, 21 USPQ2d 1941, 1943 (Fed. Cir. 1992)… (MPEP §2144.08; emphasis added)

Thus, the teaching of Gilbert alone is insufficient to establish a *prima facie* case of obviousness.

MPEP §2144.08(II) instructs that several other factors must be considered to establish a *prima facie* case of obviousness when the claimed species or subgenus is encompassed by a prior art genus. In addition to the "Graham factors," the other factors include (as paraphrased from the section titles in MPEP §2144.08(II)) considering the size of the genus and the express teachings of the prior art.

As described above, the genus taught by Gilbert encompasses an infinite number of possibilities. Therefore, the size of the genus taught by Gilbert is incredibly immense. Regarding the express teachings of the prior art, none specifically teaches an array of sensors comprising aligned, opposing pair members wherein a first distance between members of a first pair of opposing pair members differs from a second distance between members of a second pair of opposing pair members. The Office has cited Catamo for teaching an array of sensors comprising aligned, opposing pair members (see second-to-last line on page 7 through line 2 on page 8 of Office Action dated January 22, 2010). However, Catamo explicitly requires that the sensor array taught therein is positioned crosswise on a plane in a **symmetric and equidistant** manner (line 4 of section 28 of Catamo; emphasis added). Catamo in no way teaches or suggests that the configuration of the sensor array would be anything but symmetric and equidistant. There is also no teaching in the other prior art references to motivate a practitioner to modify the sensor array explicitly taught by Catamo to specifically comprise a first distance between members of a first pair of opposing pair members that differs from a second distance between members of a second pair of opposing pair members. This is true particularly in view of the large genus comprising the infinite number of possibilities taught by Gilbert.

In short, there is no teaching in the prior art that would motivate a practitioner in the art to arrive at the particular sensor array configuration recited in Claim 34 from the explicit, specific configuration taught by Catamo, the infinite number of configurations taught by Gilbert, and the teachings of Durham, Haynor, and/or putative admission.

In view of the foregoing, independent Claims 34 and dependent Claims 37, 39, 40-47, and 49-51 are not obvious over Durham, Catamo, Haynor, Gilbert, and putative admission.

Withdrawal of this rejection is requested.

Rejection of Claims 54 and 55 under 35 U.S.C. §103(a) over Durham, Catamo, Haynor, Gilbert, Putative Admission, and Hollis

This rejection has been overcome by amendment of the claims.

Claims 54 and 55 depend either directly or indirectly from Claim 34, the latter of which has been amended as described above. Claim 34 is not obvious over the combination of Durham, Catamo, Haynor, Gilbert, and putative admission for the reasons expressed above, which are incorporated in the present remarks by reference. Hollis does not correct the deficiencies of the combination of Durham, Catamo, Haynor, Gilbert, and putative admission with respect to Claim 34. Therefore, Claims 54 and 55 are not obvious over the combination of Durham, Catamo, Haynor, Gilbert, putative admission, and Hollis.

Withdrawal of this rejection is requested.

New Method Claims

Method Claims 71-91 have been added. Claims 71-91 correspond with withdrawn and previously canceled method Claims 19-22, 28, 30-33, 56-66, and 68, except that the independent method claims, Claims 71 and 81, further contain the limitations recited in Claims 1 and 34, respectively. Applicants submit that because Claims 1 and 34 are not anticipated by or obvious in view of the cited prior art, Claims 71-91 are also not anticipated by or obvious in view of the cited prior art.

Rejoinder of Method Claims to Device Claims

Independent method Claims 71 and 81 recite at least all the limitations of device Claims 1 and 34, respectively. Applicants request rejoinder of withdrawn method claims upon allowance of device claims. See *In re Ochiai*, 37 USPQ2d 1127, and *In re Brouwer*, 37 USPQ2d 1663.

CONCLUSION

In view of Applicants' amendments and Applicants' arguments submitted herein, it is believed that the above-referenced claims are now in condition for allowance. Notification of the same is respectfully requested. In addition, Applicants respectfully request the Examiner to withdraw his prior restriction requirement. If the Examiner has any questions at all with respect to Applicants' response, the Examiner is encouraged to contact the undersigned agent. The undersigned agent welcomes any attempt by the Examiner to come to a resolution of any yet outstanding issues.

Respectfully submitted,

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